

ABSTRACT OF THE DISCLOSURE

The present invention is a device to measure the deterministic structure of the variation of the gate critical dimension (CD), so that accurate topological information about CD variation within the optical field is obtained. The present invention also involves determining the most frequent gate configurations (orientation and neighboring features) in a layout of a specific circuit design, and including these most frequent gate configurations in the measurement device. The present invention further includes a method to determine CD maps across the optical field, based on the collection of CD data for specific gate configurations. The CD maps are used in the course of computer-aided design of IC's to improve the accuracy in which circuit performance metrics and yield are estimated. The present invention describes a set of methods in which the CD maps are integrated into the computer-aided design of ICs. In particular, the topological information, described by the CD maps, is used for accurate timing analysis, power dissipation analysis, yield prediction, floor planning, and placement of gates and blocks of large IC's within a chip.